CLAIMS

1.   A method of image texture analysis including the steps of:

mapping the image into a first set of binary representations of the image, wherein each representation in the set corresponds to a transformation by a first monotonically varying operator;

mapping each binary representation of the first set of binary representations into a further set of binary image representations using a second monotonically varying operator, thereby forming a matrix of binary image representations;

transforming the matrix by allocating a scalar value to each binary image representation;

arranging the scalar values in a two dimensional space against parameters of the first monotonically varying operator and the second monotonically varying operator to form a first array of scalar values; and

identifying defined texture characteristics from the resulting array of scalar values.

2.   The method of claim 1 wherein the first monotonically varying operator is a threshold operator.

3.   The method of claim 2 wherein the threshold operator applies a threshold value that varies monotonically from a minimum value to a maximum value to produce the first set of binary representations.

4.   The method of claim 1 wherein the second monotonically varying operator is a spatial operator.

5.   The method of claim 4 wherein the spatial operator applies an opening that varies monotonically from a minimum value to a maximum value to produce the further set of binary representations for each representation in the first set of binary representations.

6.   The method of claim 1 wherein the second monotonically varying operator is a morphological opening that removes all image objects below a defined size.

7.   The method of claim 6 wherein the morphological opening is a set of disc shaped structuring elements of increasing radius.

8.   The method of claim 1 further including the step of calculating a second array of scalar values derived from the first array of scalar values by taking at each point in the first array a minimum of a first difference in a first direction and a first difference in a second direction.

9.   The method of claim 1 wherein the step of identifying defined texture characteristics includes the further step of comparing the first or second array of scalar values to a knowledge base of first or second arrays of scalar values known to indicate defined texture characteristics.

10.   The method of claim 1 further including the step of calculating one or several texture feature values by computing linear sums of the values in the first or second arrays of scalar values.

11.   An image texture analysis apparatus comprising:

storage means for storing a digital representation of an image;

processing means for :

mapping the image into a first set of binary representations of the image, wherein each representation in the set corresponds to a transformation by a first monotonically varying operator;

mapping each binary representation of the first set of binary representations into a further set of binary image representations using a second monotonically varying operator, thereby forming a matrix of binary image representations;

transforming the matrix by allocating a scalar value to each binary image representation;

arranging the scalar values in a two dimensional space against parameters of the first monotonically varying operator and the

second monotonically varying operator to form a first array of scalar values; and

  identifying defined texture characteristics from the resulting first array of scalar values; and

5   display means for displaying the first array of scalar values and identified texture characteristics.

12. The apparatus of claim 11 further including means for storing a knowledge database of first arrays of scalar values known to indicate defined texture characteristics and means for comparing the first array of 10 scalar values with the knowledge database of first arrays of scalar values to identify defined texture characteristics.